

Comprehensive Nutrient Management Plan

For

Walnutdale Farms, LLC.

NPDES General Permit No: MIG019000

NPDES Permit Certificate of Coverage No: MIG010063

Overview

The Walnutdale Farms, LLC. Dairy is an existing dairy operation that is located at 4309 14th ST. in Section 13 of Dorr Township in Allegan County, Michigan. This is an incorporated family farm owned by (b) (6)

(b) (6) This operation is home to the following livestock:

- Lactating Cows @ 1,400lbs 820 head
- Lactating Cows or Freshening Heifers @ 1,200lbs 220 head
- Lactating Cows or Freshening Heifers @ 1,100lbs 400 head
- Bred Heifers on Pasture @ 1,000lbs 20 head (grazing season only)

The total number of animals is 1,460 cows, weighing an average of 1,282lbs, totaling 1,872 animal units (based on 1,000lbs of live weight). The cattle are primarily Holstein and Jerseys (accounting for the smaller sizes). A detailed breakdown of the cattle identified above can be found in appendix ten on the table identified as Animal Production Data. A map showing where each group is housed can be found in appendix one.

Walnutdale Farms, LLC. manages 1,900 acres of land as crop production, and 12 as pasture during the grazing season. Crops produced include alfalfa harvested as haylage, wheat that is either chopped as forage or harvested as grain, triticale that is chopped as forage, soybeans harvested as grain, and corn that is either chopped or harvested as grain.

Based on current soil test levels (3 years or more recent) there are 1,830 acres that are available for manure application based on the soil tests levels. These acres have phosphorus levels under 300 lbs/acre (150ppm) as determined using the Bray P1 extraction method. Soil testing is done on a three year rotation. Fields are sampled using management zones of 20 acres or under, based on crop history; management practices and soil types or they have been sampled utilizing GPS on a 2.5 acre grid scheme to obtain more precise fertility levels.

The total amount of phosphorus excreted in manure by cattle at the Walnutdale facility is less than the projected phosphorus uptake by crops produced on the land base Walnutdale manages. Detailed mass balance feed analysis and crop uptake rates can be found in appendix ten.

This Comprehensive Nutrient Management Plan (CNMP) will identify management practices, guidelines and requirements that Walnutdale farms will adhere to in accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit that covers this facility.

This CNMP will be updated annually and reporting to the Michigan Department of Environmental Quality (MDEQ) will be done according to the NPDES General permit. A 10% change in livestock numbers or land needs or any significant changes in storage structures or capacities will require that the plan be updated to reflect those changes. The CNMP will be recertified ever three years.

There are no current plans for expansion at the Walnutdale Dairy facility.

Resource Concerns:

Water quality concerns that are addressed in the CNMP include proper management of waste at the farm site that has a county drain running around the facility and another that runs under the livestock production facility (buried at a depth of 6-7'). The CNMP also focused on surface waters (i.e. ditches, county drains, tributaries, rivers) that surround the land base that receives waste application from the Walnutdale dairy facility. The county drain that runs under the Walnutdale facility flows into Red Run drain which eventually flows into the Rabbit River. The majority of the land base receiving waste applications from the Walnutdale facility are located in the Rabbit River watershed. This plan, in association with proper training, implementation and management will help reduce the risk of nutrient movement offsite from the production or cropping area.

Manure Production & Storages: Table 1. Estimated Yearly Manure Production

Walnutdale Dairy Estimated Yearly Manure Production

Storage ID	Vol. Manure Collected		Vol. Bedding		Wash Water (gallons)	Flush water (gallons)	Runoff Collected (gallons)	Leachate collected (gallons)	Direct Precip (gallons)	Total Waste Collected (yearly)	
Pit 1	1,485,575	gal	174,236	gal					258,359	1,918,170	gallons
Pit 2	3,030,393	gal	406,552	gal					526,891	3,963,836	gallons
Slurry Store	355,351	gal	0	gal	1,097,919	731,946			394,421	2,579,637	gallons
Pit 6	981,540	gal	141,567	gal					170,768	1,293,875	gallons
Pit 7	2,599,756	gal	304,914	gal					451,867	3,356,537	gallons
Pit 8 E. Storage	0	gal	0	gal					1,216,033	1,216,033	gallons
Catch Basin	0	gal	0	gal			3,433,544	250,580	670,732	4,354,856	gallons
Settling Basin	59	tons	0	tons						59	Tons
Hospital West	105	tons	5	tons						110	Tons
Pastures	99	tons	0	tons						99	Tons
									Manure	14,328,088	gallons
Direct precip on settling basin + Slurry store									Catch Basin	4,354,856	gallons
									Solids	268	Tons

The above table identifies the total volumes of manure collected in each manure storage structure during a year. The values above are from the Animal Waste Management (AWM) program and the Purdue Manure Management Planner (MMP) program. Additional details that show contributing groups and additional information can be found in appendix ten.

All cattle at the Walnutdale Dairy facility are lactating dairy cows with the exception of the heifers that are on pasture in the summer. Cows are all freshened at another facility. All lactating cows are housed in free stall barns at all times except when crossing the walkways from the parlor to the free stall barns. Cow management groups are noted on the overview maps in appendix one and weights, numbers, and feed program information can be found on the Feed Nutrient Intake sheet that is part of the mass balance table in appendix ten.

No animals at the Walnutdale dairy have access to surface waters. The pasture surrounding the catch basin has an outlet for 24" drain that surfaces and flows overland through it (location and direction of surface water flow are identified on the site map). Cattle are allowed to graze this area only when conditions are favorable and water is not flowing through across the surface of the pasture.

Manure Collection:

Free stall barns are bedded with sand and are scraped daily with a uniloader directly into manure storage structures. The average rate of sand per cow per year has been estimated at five cubic yards.

The hospital barn has one section that is bedded with straw; this manure is managed as a pen pack and cleaned when conditions are favorable for land application. The pen pack is cleaned approximately every two months. Manure is loaded with a uniloader directly into land application equipment.

When pit #8, the storage located to the east of the farm, is emptied and field conditions are favorable for land application, the solids that have settled are scraped out with a loader and loaded directly into land application equipment.

Grazing cattle deposit manure across pastures while feeding. Manure deposition is monitored, if areas of concentrated deposition are found, the area is scraped with a uniloader and land applied at agronomic rates.

Management Groups and Storage Structures:

Listed below are cattle management groups (as noted on the overview maps) and the storage structures that the manure from each group is collected in.

Pit #1: Groups 1&2

Pit #2: Groups 3,4,5 and 6

Settling Tank: Holding pen manure, all groups contribute to this while waiting for milking, liquid is transferred to the slurry store, solids are land applied.

Slurry Store: All groups contribute while being milked, flush water from rinsing the system and wash water from the parlor area are stored here, in addition to the transferred liquids from the settling tank.

Pit #6: Groups 9&10

Pit #7: Groups 7&8

Pit #8 East Storage: This storage structure is used to hold the manure over the winter or during the cropping season.

Catch Basin: All lot runoff and leachate are collected in this structure

Hospital Building: Hospital cows, managed as pen pack

Pasture: Heifers on pasture from May to September

Wash water and Parlor Flush water production: Estimated daily production of wash water at the Walnutdale facility is 3,000 gallons per day. The flush water volume used daily is 2,000 gallons per day. These volumes are producer estimates. All water from the parlor area is plumped to the settling tank, or is collected in drains located on the floor of the parlor and is piped into the settling tank located to the east of the parlor building. After flowing over the settling wall, the high percentage liquid is pumped into the slurry store with an overhead line.

Collection of Contaminated Runoff: In appendix one there is an overhead map of the Walnutdale facility labeled Site Map Collected Area. This map is from a precision ag program that estimates the area within a created set of polygons using aerial imagery. The catch basin to the north of the production facility collects all surface runoff from the production area. The inlets for the collection lines are noted on other versions of the site maps. The areas outlined in the green/yellow line on the overhead map are concrete or gravel areas that have collection points flowing into the catch basin. The total area collected is 6.07 acres (evaluated as all impermeable surfaces in the AWM calculations).

Manure Storage Descriptions: Supporting calculations and as-built drawings can be found in appendices nine and ten.

- **Pits 1&2:** Storage facilities 1&2 are reinforced concrete structures that were constructed in 1998 with Michigan Natural Resource Conservation Service (NRCS) assistance, to the same design specifications. Manure is scraped from the forestall barn onto a small push off ramp into a reinforced concrete storage structure. Michigan NRCS standard drawing, SO-E-0090 was used in developing these storage practices. Pits 1&2 have the following measurements, 55' x 35' x 6' with a 36' long ramp the full width of the facility. The freeboard level of this storage structure should be maintained at one foot. Based on the manure production and bedding volumes of the groups that contribute to each storage, Pits one and two have a usable volume of 76,820 gallons.
- **Slurry Store:** Based on farm records, the slurry store was constructed by A.O. Smith Harvestore Products, Inc. in 1976. This is a circular structure that has an 80' diameter and is 25' high.

Freeboard in this structure will be maintained at one foot. The usable storage volume for this structure is 878,818 gallons.

- **Pit 6:** Storage facility number six is a reinforced concrete storage that was constructed in 1998 with Michigan Natural Resource Conservation Service (NRCS) assistance, to the same design specifications. Manure is scraped from the free stall barn onto a small push off ramp into a reinforced concrete storage structure. Michigan NRCS standard drawing, SO-E-0090 was used in developing these storage practices. Pit 6 has the following measurements, 42' x 34' x 6' with a 36' long ramp the full width of the facility. The freeboard level of this storage structure should be maintained at one foot. Based on the manure production and bedding volumes of the groups that contribute to this storage, Pit six has a usable volume of 57,977 gallons.
- **Pit 7:** Storage number seven was constructed in approximately 2000, by WLR Ag Construction. It is a reinforced concrete storage that measures 44' x 44' x 6' with a 36' long 6:1 ramp. Manure is scraped from the free stall barn and over the edge of the pit on a small push off ramp. The freeboard level of this structure should be maintained at one foot. Based on the manure production and bedding volumes of the groups that contribute to this storage, Pit seven has a usable volume of 95,063 gallons.
- **Pit 8 Manure Storage Pit:** This storage located to the east of the farm has as concrete floor and rubber lined sidewalls. It measures 330' x 260' and is 15.8 feet deep. This manure storage was constructed in 2003 with the assistance of NTH Consultants in coordination with the NRCS. This rubber lined pit serves as the long term manure storage pit that holds manure over the winter or through the cropping season. This pit does not receive any inputs other than manure transfers or direct precipitation. The freeboard should be maintained at one foot for this structure. The usable capacity of this structure is 4,969,308 gallons.
- **Catch Basin:** This storage collects all lot runoff and silage leachate from the Walnutdale Dairy facility that was constructed in 2006. This storage is a rubber lined structure that has an estimated usable capacity just under three million gallons. Sections of the floor of this storage have had concrete poured ovetop to prevent gas bubbles, 'hippos,' from forming and reducing the storage capacity of this structure. These issues are monitored and addressed by Walnutdale with proper consultation. The freeboard level for this facility should be maintained at 2.1 feet to accommodate the runoff collected in a 25 year, 24 hour storm event.
- **Settling Tank:** This structure was installed in the spring of 2011. It serves a settling tank for all liquid from the parlor and holding area, the solids settle to the bottom of the tank and are cleaned out, while the high percentage liquid flows over the separating wall and is then transferred into the slurry store by an overhead pipe.
- **Hospital Barn:** The hospital barn is managed as pen pack straw manure. This manure is stored until conditions are favorable for application (approximately once every two months or when needed).
- **Construction Data:** All available documentation is provided in appendices nine and ten. This data includes design information, as-built documentation, evaluation of existing components and supporting calculations for the volumes of manure each facility receives.

Walnutdale Dairy Liquid Manure Storage Table 2.

Storage ID	Usable Volume (gallons)	Usable Volume (cu-ft)	Estimated production (gallons)	Storage Time (days)
Pit 1	76,820	10,270	1,918,170	14.6
Pit 2	76,820	10,270	3,963,836	7.1
Slurry Store	878,818	117,489	2,579,637	124.3
Pit 6	57,977	7,751	1,293,875	16.4
Pit 7	95,063	12,709	3,356,537	10.3
Pit 8 Storage	4,969,308	664,346	1,216,033	1,491.6
Catch Basin	2,928,555	391,518	4,354,856	245.5
Farm Total:	9,083,360	1,214,353	18,682,944	177.5

Liquid Storage Capacity: Based on the storage capacities and the estimated annual production of waste generated at the Walnutdale dairy facility, there is currently 177.5 days of storage. This number represents all runoff being collected from the Haylage located on the south end of the dairy facility. This pad has diversion berms and different collection drains that allow only one half of the runoff to be collected during a given time period. When the haylage bags are open and there is an active face of feed exposed, or when bags are being filled and leachate is a concern, the drains to the catch basin are open. When the bags on one half of the pad are closed, the diversion boards and berms are set to divert the clean (uncontaminated) runoff to the 24" drain running under the farm. Proper management and monitoring of the diversion equipment brings the total days of storage for this facility over the 180 day requirement in the NPDES permit.

Storage Information & Requirements:

A. CAFO waste storage requirements

- a. NPDES General Permit requires that the facility have 180 days of storage capacity.
 - i. Based on current estimates of production numbers and storage capacities, this facility has 177.5 days of storage. Proper management of the Haylage pad on the south side of the facility brings the estimated days of storage over the 180 day mark.
 - ii. All liquid manure facilities have markers identifying the space required to accommodate the 25 year, 24 hour storm event. (b) (6) (b) (6) or one of the staff at Walnutdale dairy monitors and maintains the pit markers.
 - iii. All liquid manure storage facilities have freeboard markers at one foot to account for emergency storage volumes (as required for uncovered manure

storage facilities). The catch basin also has a marker at 2.1 feet, the space needed to collect a 25 year, 24 hour storm event.

b. Physical Design & Construction Requirements

- i. Depth gauges have been installed to reflect the proper freeboard levels for both the emergency storage space and the freeboard levels required to contain the 25 year, 24 hour storm event.

ii. Structural Design of the manure storage facilities is described below:

- 1. Pits #1,2, and 6, Construction was done in 1998 with the assistance of Michigan NRCS standard drawing, SO-E-0090 was used in developing these storage practices. An evaluation of existing components letter from the NRCS from March of 2001 can be found in appendix nine.
- 2. The Slurry Store was estimated to have been constructed in 1976, evaluation of existing components for this facility is also on the NRCS letter from March 2001 in appendix nine.
- 3. Pit #7 was constructed in 2000, supporting paperwork for the design of this facility was lost in a fire at the Walnuthdale facility in the spring of 2010.
- 4. Pit #8 was constructed in 2003 with assistance from NTH Consultants and the NRCS . As-built documentation on this structure can be found in appendix nine.
- 5. The Catch Basin was constructed in 2006, the design information for this structure can be found in appendix nine.

iii. Manure Storage Inspection Requirements:

- 1. Manure storage inspection will be done on a weekly basis and recorded on the inspection forms found in appendix five. These forms are forms from the MDEQ. The inspection will review any evidence of cracking, proper control of vegetation near the facility, evidence of overflows, leaks, seeps, erosion, animal burrowing or break through and the conditions of the storage structure.
- 2. The freeboard level will be recorded during this inspection.
- 3. Walnuthdale will conduct periodic visual inspection, proper operation, and maintenance of all CAFO waste-handling equipment, including piping and transfer lines, and all runoff management devices (e.g., barnyards, catch basins, screens or other points of runoff collection) to prevent unauthorized discharges to surface water and groundwater. These activities will be conducted at the frequencies noted below. Records of inspections and corrective actions will be stored at the office and maintained by (b) (6) (b) (6) for five years. All deficiencies will be corrected as soon as possible. Any deficiencies not corrected within 30 days must be accompanied by an explanation of the factors causing the delayed correction.

- a. Visual Inspection of all clean storm water and floodwater diversion devices will be done weekly. This includes inspection of all clean water collection inlets, outlets and monitoring the conditions of the 24" drain inlets and outlets. Any gutters that are installed on buildings used as a diversion of clean water will also be inspected weekly.
 - b. Visual inspection of water lines, including drinking water lines supplying cattle, and the cooling water lines for the parlor will be conducted daily.
 - c. Visual inspection of above ground waste transfer lines will be conducted daily on the transfer line from the settling tank to the slurry store, and will be monitored daily during use for all other transfer plumbing when in operation (i.e. pumping manure from one of the reception pits to storage #8, monitoring the transfer pipes that are used to load the application equipment).
- iv. Operations & Maintenance guideline for manure storage facilities can be found in appendix ten.
 - 1. In the event that the volume of waste in a storage structure enters the emergency volume level (the twelve inches of freeboard) and it cannot be immediately reduced by proper land application or transfer to one of the other storage structures, the MDEQ will be notified of this event. The level of waste will be lowered within one week, unless a longer timer period is authorized by the DEQ. Any time this occurs, records will be maintained with the CNMP.
 - 2. During the time period between November first, and December 31st, a minimum of six months of storage space will be achieved. When this occurs, the volume available and the date will be recorded and submitted as required.
 - 3. Vegetation will be maintained around the storage facilities in an acceptable manner. The areas will be mowed as needed and woody vegetation will be prevented from growing around the storage structures.
 - 4. Any damages to the structure will be corrected immediately and the problems and corrective actions will be documented appropriately.
 - 5. The manure storage facilities at the Walnutdale dairy facility are concrete or rubber lined, the integrity of the structures will be monitored as outlined above.
 - 6. Any problems in the manure transfer system (pumps, piping and loading equipment) will be identified and corrected as soon as possible. Problems will be identified and corrective actions recorded and maintained for five years. Any deficiency that is not corrected within 30

days must have documentation of the problem and an explanation of the factors causing the delay in the corrective action.

7. All waste produced at this facility will be stored only in the storages listed above.

Manure Treatment: At the current time, there is no treatment process performed on manure at this facility.

Manure Transfer: Manure stored in pits is agitated prior to loading, this is done with a pto powered mechanical device. Liquid manure is pumped using a pto driven pump and is loaded directly into land application equipment, or into semi tankers for direct application or transfer over at the field. Manure transferred at the field is pumped from the semi tanker into the spreader with an overhead pipe that swings over the spreader. All dry manure is loaded directly into a slinger or box spreader with a uniloader or pay loader. Solids from the bottom of the storage pits are handled in the same fashion as the dry pen pack manure. Equipment is backed into the manure storage structures and loaded directly for land application.

Manure Application Equipment: All spreading equipment will be inspected on a daily basis (during use periods) by the operators prior to land application. These inspections will be recorded on the DEQ provided daily application form that can be found in appendix five.

Application equipment utilized by the Walnutdale Dairy facility includes the following:

- Balzer and Houle Liquid tankers approximately 7,000 gallons, equipped for surface application or injection
- Semi Tankers that are 7,000 gallon capacity to 9,000 gallons that are used as transfer equipment for field longer distances from the farm, or are also equipped for surface application of manure on fields.
- Side Slinger spreader that can apply liquids or solid manure. When hauling solids, the slinger has an estimated capacity of 10 tons/load. Liquid capacity is estimated at 2,900 gallons.
- Box spreaders are available, these spreaders have an estimated capacity of 4 tons/load of solids.
- Dragline application (both surface and injected) and irrigation are performed by a custom manure applicator. This application is done with a stationary pump near the manure pit and miles of line that is pulled across the field. The line is plumbed directly into a toolbar mounted on the rear of a tractor, the operator controls whether the manure is injected or surface applied prior to beginning operation. The custom applicator is responsible for the recordkeeping on his equipment.
- Irrigation of catch basin and slurry store wastes has been done during the crop season. An irrigation gun on a pull reel is pulled across the alfalfa or corn field as it is supplied by a pump at the farm. This method of application is also done by the custom firm.

Walnutdale Dairy employees are trained to operate application equipment properly and observe setbacks around sensitive areas. Fields managed by Walnutdale have maps included in appendix two

that show sensitive areas in various colors indicating setbacks and buffer areas. Walnutdale will make sure application takes place following the setbacks on the maps.

Manure applications will be recorded on the forms in appendix five and will be maintained by (b) (6) or one of his staff at the Walnutdale Dairy office. Annual reports will be submitted with the appropriate data.

Production Area Conservation & Management Practices

The management practices utilized by Walnutdale Dairy will help minimize the risk of CAFO waste impacting surface or groundwater. Below are descriptions of some requirements and management practices that are implemented at the Walnutdale dairy facility.

1. Conservation Practices at the production area include proper management of loading areas where manure is transferred from storage structures to the land application equipment. These areas are monitored for spills and kept clean. Vegetation around the storage structures is maintained to prevent erosion.
 - a. Odor is a concern for all types of animal management. Manure storage facilities are monitored to ensure proper operations and maintenance.
 - b. Land application of CAFO waste also poses a point of concern from an odor management standpoint. Walnutdale injects or incorporates manure within 24 hours of application. Equipment used for manure application and manure transfer (semi tankers) will be kept clean and functioning properly to help minimize odor issues at the point of transfer.
2. Diversion of Clean Water is an important aspect of the production area management at the Walnutdale Dairy facility. Diverting clean water results in less manure volume to haul reducing the costs to the operation.
 - a. Roof runoff on the free stall barns located along 14th street all flows to the east through the lawn where clean water drains collect the runoff. These clean water lines all connect to the 24" clean water line that runs under the production area and outlets in the pasture east of the catch basin. Roof runoff from the Groups 7&8 buildings is collected in the catch basin because runoff comes into contact with the feed alleys and is no longer considered clean water. Clean water drains are also located to the east of the dry storage building that collects clean water from the roof is collected and diverted to the 24" drain. A clean water drain is also located on the southeast of the shop that collects that runoff and diverts it to the 24" drain as well.
 - b. Plate cooler water is recycled as drinking water for the cattle.
 - c. Lots and driveways are kept clean to ensure that manure doesn't get tracked or carried outside of the area collected in the catch basin in the event of a rainfall.
 - d. Feed Storage:

- i. Commodities are stored in two commodity sheds, one is located to the east of the dry storage facility, and the other is directly north of the slurry store. These are covered facilities. The building to the southeast has a concrete pad located to the south of the building has collection inlets that run to the 18" line that runs under the production area that surfaces next to the slurry store and flows into the catch basin inlet. This collection inlet ensures that any spilled feed or rainfall coming into contact with that feed is collected as required. The area around the commodity shed by the slurry store all slopes down to the collection inlet for the catch basin.
 - ii. Silage and Haylage is managed to prevent the offsite movement of leachate, and to prevent feed from spoiling and being lost in the loading/mixing process. Any spilled feedstuffs are handled as dry manure and land applied at agronomic rates. All piles/bags of feedstuffs are managed to have minimal area exposed to reduce spoilage and contamination concerns.
 - 1. The corn silage pad is located between the storage pit #8, the slurry store, the barns housing groups 7&8 and the dry storage and commodity shed. This area slopes to the west and all runoff from this pad is collected in the catch basin, or diverted to pit 6 (a former management practice that is no longer used, but still an option). Each year an estimated 25,000 tons of corn silage is stored. Using the NRCS Agricultural Waste Management Field Handbook, part 651, chapt. 4, pg 23, the estimated runoff from the corn silage pile is 187,000 gallons (supporting data found in appendix ten).
 - 2. The haylage and any small grains that are harvested for forage are stored in ag-bags on the haylage pad located on the southeast of the facility. This pad is a paved lot that slopes to the west, where collection inlets are found. The haylage pad has diversion curbs and inlets that allow Walnutdale to divert clean water to the 24" line when all the bags on that half of the pad are sealed, resulting in only clean water coming off the pad. The curbs are located on the west end and have slots for boards to be placed or removed to divert the clean water into the clean water inlet, or let it flow to the contaminated inlet running into the 18" line. Walnutdale estimates that 8,500 tons of haylage and small grains are stored annually. This volume of feed stored at approximately 60% moisture is projected to produce 63,580 gallons of leachate that will all be collected through the 18" drain and stored in the catch basin.
 - e. Feed Refusal is estimated at 2% by Walnutdale management. Refused feed is cleaned up and land applied at agronomic rates.
3. Livestock at this facility are housed inside with the exception of the walkways between buildings, and the pastures located to the north of the production area. No cattle have access to any waters of the state.

- a. 10-20 bred heifers are pastured on the two pastures north of the Walnutdale dairy production area. These cattle are present from May through September. The pasture is predominantly grasses with some clover as well. This is the main source of forage for the cattle that graze them during the summer. The pasture quality is monitored closely to ensure adequate nutrition, and proper pasture management is followed. Walnutdale manages these pastures to retain 6-8" of growth throughout the season. This is accomplished by rotating, populating or depopulating the pastures depending on rainfall and forage quality. A Pasture Management record keeping form has been included in appendix five.
 - b. Management of ground cover is closely monitored, when areas of high traffic are determined to have insufficient cover, temporary fences are installed and grasses are broadcast to re-establish the vegetation. This management ensures that the nutrients found in the manure from the cattle are utilized by growing vegetation.
 - c. Livestock are excluded from the drain that runs along the pastures with a permanent fence. Cattle will not be allowed access to the county drain.
 - d. Fertilizer has not been applied to the pasture areas in the past, it may be implemented going forward based on soil test data and economic and management conditions and decisions. Any fertilizer applied will be done at agronomic rates according to Tri-State guidelines.
- 4. Animal mortalities from this facility are picked up by a local rendering firm. All animals are disposed of by approved methods according to the Michigan Bodies of Dead Animals Act. Mortality records will be maintained by Walnutdale dairy employees and will be kept at the office (record keeping forms can be found in appendix five).
- 5. Improper chemical disposal at this facility will not be allowed. Pesticides are not applied by Walnutdale dairy and will not be stored at this facility.
 - a. Veterinary wastes are stored in a designated sharps container and are removed from the facility by a licensed waste hauler.
 - b. Petroleum products are found in the shop building but are confined to that location. Improper disposal of those products will not be allowed.
 - c. Fuel storage consists of tanks located on the southwest corner of the shop building. These are portable tanks that do not require containment. The tanks are inspected monthly to ensure proper functionality.
- 6. Inspections and Operations & Maintenance of all waste handling equipment, plumbing, and any management devices will be performed on the following schedules:
 - a. Weekly visual inspections around buildings will be conducted during manure storage reviews. These inspections will note any erosion issues or clean water management practice concerns.
 - b. Daily inspection of plumbing will be done as described on pages seven and eight of this document.
 - c. Any problems identified will be addressed in a timely fashion and records of corrective actions will be maintained as identified on page eight.

- d. Any deficiencies that are identified and cannot be fixed within 30 days will have explanations as to why the corrective action was delayed.
7. Water supply wells are located between 14th street and the group two building and to the north west of the group ten building. Both well locations are identified on a site map, isolation distances are noted on a page following the site map.
 - a. The isolation distance for the Barn Well (1999) from the existing waste storage facilities the catch basin and pit #6 does not appear to meet the minimum of the state of Michigan isolation distance requirements.
 - b. Well Isolation distance worksheets and well logs can be found in appendix ten.

Non-Production Area Storm Water Management: Walnutdale implements practices including preventative maintenance, good housekeeping and periodic inspections at least once a year to minimize and control pollutants in storm water discharges associated with the following areas:

- Driveways and access roads are monitored for pollutants and dust. Dust control measures are used when appropriate.
- There are no sites used for handling materials other than CAFO wastes, or feedstuffs at the Walnutdale facility.
- Refuse sites are kept clean and dumpsters serviced regularly to prevent odors or pollution.
- Application equipment is kept clean and parked where any runoff or spill will flow into the collection inlets that go to the catch basin. Equipment parked on the haylage pad will be monitored to verify that any runoff is being collected.
- All shipping and receiving areas are kept clean to prevent pollution and for safety measures.
- Yearly inspections of non-production store water and general facility management will be performed and documented by (b) (6) (b) (6) or one of the staff at Walnutdale dairy.

Nutrient Production & Management

Nutrient Production & Land Requirement: Using the mass balance analysis method to determine the phosphorus production involves reviewing phosphorus levels in the feed program, determining the phosphorus removal in milk produced, calves shipped off the farm and retained in the cows that die or are culled. Based on Walnutdale's feed rations and milk production as of 4-5-11, the Walnutdale dairy facility produces and estimated 117,123 lbs. of P₂O₅ excreted by cattle in the form of manure (see appendix ten for the mass balance analysis worksheets).

Manure applications are made based on the crop yield goals for each field. These yield goals are reasonable based on past yields, management practices and soil types. A detailed plan for each field describing the nutrients applied in the form of manure and the recommended fertilizer rates can be found in appendices three and four. Below is a table showing crop uptake on the land base that Walnutdale manages (please note that some acres are double cropped in a season accounting for increased removal rates).

Walnutdale Crop Nutrient Uptake
Table 3.

Crop	2012	Yield Goal	Estimated Crop Nutrient Removal (using GAAMPs values below)			
		Per Acre				
				Total N	P2O5	K2O
	Acres	(tons/bushel)	(lb)	(lb)	(lb)	(lb)
Corn-silage (tons)	86	21	16,976	5,960	14,448	
Corn-silage (tons)	660.5	20	124,174	43,593	105,680	
Corn-silage (tons)	125	18	21,150	7,425	18,000	
Corn-silage (tons)	357	17	57,049	20,028	48,552	
Corn-silage (tons)	0	15	0	0	0	
Corn-grain (bu)	36	140	4,536	1,865	1,361	
Alfalfa (wet tons)	146	17	34,748	10,424	29,784	
Alfalfa (wet tons)	360	15	75,600	22,680	64,800	
Alfalfa (wet tons)	92	12	15,456	4,637	13,248	
Pasture	12	8	1,344	403	1,152	
Triticale (wet tons)	174	9	0	2,349	8,143	
Wheat-grain (bu)	38	75	3,420	1,796	1,055	
Wheat-straw (tons)	38	1.5	741	188	1,311	
Soybeans (bu)	0	40	0	0	0	
Totals:			355,194	121,347	307,534	
Dairy Facility	1912.5			63.45 lbs/acre		
Pounds of Nutrient Removed per Unit:						
	Crop	Unit	Avail-N	P2O5	K2O	
	Corn-silage	tons	9.4	3.3	8	
	Corn-grain	bu	0.9	0.37	0.27	
	Alfalfa	tons	45	13	45	
	Alfalfa Haylage	tons	14	4.2	12	
	Wheat-grain	bu	1.2	0.63	0.37	
	Wheat-straw	tons	13	3.3	23	
	Soybeans	bu	3.8	0.8	1.4	
	Triticale	tons		1.5	5.2	

Triticale crop removal is based on research from numerous sources; there is currently no set value for triticale being chopped for forage that could be located.

Crop nutrient removal is an essential part of managing the wastes produced at the dairy facility. A review of the Walnutdale crop plan and average yield goals finds that the average P2O5 removal rate for land managed by the Walnutdale dairy is 63.45 lbs/acre. There are currently 1,912.5 acres under the management of Walnutdale dairy utilizing an estimated 121,347 lbs/year of P2O5 in crop removal.

Based on the phosphorus produced by cattle at the Walnutdale facility, and the land base that is managed at the dairy facility this operation produces less phosphorus through the cattle than what the crops uptake each year. The proper management of CAFO wastes and crop production practices will ensure that this facility remains sustainable from a phosphorus balance standpoint. Commercial fertilizers will be purchased when needed for crop production, but crops will be managed to maximize the return on manure applications each year.

Walnutdale has worked with area row crop producers in the past who received manure applications on their ground in the past. Any fields that will receive manure from the Walnutdale facility will have the gone through the proper inspections and processes to include those fields in the CNMP for the Walnutdale facility. Those records will be submitted to the DEQ well in advance of application to allow for the public notice process to be reviewed and completed. Any manure that is not applied by Walnutdale employees, or done with Walnutdale equipment will be recorded as required on the Manifest forms provided by the DEQ. A copy of that form can be found in appendix five.

Nutrient Testing Procedures:

Manure Testing: Manure tests are taken at least once per year as required by the NPDES permit for this facility. These tests are usually taken when manure application equipment is being loaded prior to field application of CAFO waste. This ensures an accurate sample representing what is being applied to the fields. Manure tests results can be found in appendix four.

Soil Sampling: Soil samples have been taken by Green Valley Agricultural, Inc. Sampling is done at the depth of tillage (8-10") and is done on zones (less than 20 acres) or done using gps technology on a grid basis. All soil sampling data can be found in appendix three. All manure and soil tests have been analyzed by A&L Great Lakes Laboratories.

Zone sampling has been done based on field management, soil types and cropping history. GPS sampling is done on 2.5 acre grid patterns across the fields. This system shows a more detailed map of fertility in the field, showing some high areas and some deficient areas. This information allows Walnutdale to skip application on high zones and identify the low fertility areas for manure or fertilizer application. Walnutdale implements variable rate fertilizer applications by Green Valley Agricultural, Inc. to supplement the manure applications in crop production.

Nutrient Management & Crop Production: Walnutdale's crop fertility program is primarily focused on utilizing the nutrients found in the manure as the primary source of nutrients in crop production. Walnutdale supplements the manure application with commercial nitrogen and potassium where needed and economically feasible. Commercial phosphorus applied to Walnutdale managed fields is confined to the following practices:

- Foliar application of liquid fertilizers (2-13% concentration applied less than 2 gallons/acre) on alfalfa and soybean ground
- An in-furrow Pop-up fertilizer on corn (same concentration and rates as above) on all acreage to start the corn growing before it has the adequate root structure to pick up the available phosphorus in the soil structure.
- A higher concentration of phosphorus (10-15 gallons/acre) is included in the liquid corn starter program when planting fields that are low or deficient in phosphorus and do not receive manure applications.
- Broadcast of dry phosphorus is limited to the deficient fields in corn production, alfalfa fields that do not receive manure and are calling for an application of phosphorus and as a starter prior to new seedings of alfalfa being planted when manure was not applied.

A detailed crop plan can be found in appendix three. This plan shows planned crops, yield goals and recommendations generated by the MMP program. The custom recommendations show the rates for fields that have been grid sampled and will be applied variable rate. These rates and notes show average lbs/acre of nutrient to apply. Potassium needs will be addressed VR where needed.

Nitrogen management in crop production at the Walnuthdale dairy takes into account manure applications from the current and following years in addition to any other nitrogen sources that impact the crop production. Outlined below are examples of the different nitrogen management programs implemented by Walnuthdale Dairy:

- All corn fields are planted with liquid starter that ranges from 15-25# of N/acre
- A review of fall applied manure is done in the winter, and plans are developed for manure application to occur in the spring. Based on the manure applications that did or did not occur on a field, one of the following scenarios is implemented
 - Manure applications are determined to have provided enough nitrogen for crop production, typically the spring injected manure application fall into this group
 - Manure application records indicate that the manure will not provide enough nitrogen for crop production
 - PSNT Tests are taken, and commercial fertilizer is applied at side dress
 - When manure was not applied to the field prior to the growing season, a review of past applications is conducted, and the appropriate credits are taken and commercial fertilizers are applied preplant to supply the crop with nitrogen
- All fields are monitored throughout the growing season. Any fields showing signs of nitrogen deficiencies are reviewed, samples are taken when needed, and deficiencies addressed when applicable.
- All commercial fertilizer applications are recorded and submitted as required by the NPDES permit for this facility.

Walnuthdale's nitrogen management program is under constant review to verify that yields are not lost, and nitrogen is not oversupplied. This review has included stalk testing at the end of seasons to determine the nitrogen uptake and supply for the corn crop. All records are maintained by (b) (6)

(b) (6)

Manure Application Rates: Manure will be applied only to fields that have phosphorus levels below 300lbs/acre (determined by the Bray P1 testing procedure). Applications are made at agronomic rates based on soil tests levels and planned crops. A chart has been provided in appendix four that shows the recommended rate of manure from each storage for the different crops and yield goals.

Manure being applied to fields that have phosphorus soil test levels under 150 lbs/acre (75ppm) may receive manure applications that supply the nitrogen required for crop production. The manure rates vs. crops chart outlines the application rates based on method of application (surface application or injection) that will supply the crop with the appropriate amount of nitrogen.

Manure applied to fields with phosphorus soil tests levels between 150-300 lbs/acre will receive only one year of phosphorus based on the crop removal rate per application. When application equipment cannot apply one year of removal (the machine cannot apply that low of a rate), or if crop rotation dictates that a two year application of phosphorus would be beneficial (i.e. corn/soybean rotation where the manure is applied based on both years of phosphorus removal while the corn utilizes the nitrogen in the manure) manure will be applied at two years of phosphorus removal. Records will be maintained and the field will not receive manure applications the following season.

Proper management of phosphorus is very important at the Walnutdale Dairy facility. Applications will be applied and recorded as required by the NPDES permit.

Phosphorus Loading: Soils that are either naturally high in phosphorus or have had heavy phosphorus loading (from manure applications or from over application of commercial fertilizers) may not have the capacity to attach additional phosphorus. Applying phosphorus to these soils may result in unattached phosphorus in the soil and the potential for offsite movement of this phosphorus is increased. This soluble phosphorus is very mobile and measure of control may need to be considered to reduce the risk of offsite movement. Phosphorus will be applied at agronomic rates according to soil tests and cropping systems. This management will prevent the loading of soils.

On soils where there is a phosphorus deficiency and nutrient recommendations call for building the soil levels of phosphorus, manure will be applied as the primary phosphorus source. This manure will be applied within the parameters listed above regarding manure application rates on soils that test lower than 150 lbs/acre.

Manure will not be applied on fields with phosphorus levels over 300lbs/acre. By following the guidelines in this plan and proper management, Walnutdale will minimize phosphorus buildup and promote sustainability. Soil tests are taken every three years to monitor soil nutrient levels.

Phosphorus Reduction: Phosphorus reduction is targeted on fields where soil tests exceed 300lbs/acre. Based on current soil tests, there are approximately 70 acres managed by Walnutdale Dairy that are over the 300lbs/acre mark. Fields with soil tests showing an excess of phosphorus may not receive manure applications. These fields have been identified in red on the application maps found in appendix two. Proper management will prevent the application of excess nutrients that will not be utilized by the crops. The best method of reducing phosphorus levels in the soil is through crop removal. Walnutdale focuses its cropping program on high phosphorus fields to remove as much nutrients as possible during the cropping season. This has been done by double cropping small grains harvested as forage followed by silage corn, or through seeding the high phosphorus fields to alfalfa. Even with intense cropping systems, drawdown of phosphorus levels in the soil structure is a lengthy process. The best management is to prevent phosphorus loading.

Record and Inspection Procedures for Fields used for Application of CAFO Waste

1. Field Data, Evaluations and Inspection Procedures

- a. Field by field Inspections have been conducted on each field planned to receive applications of CAFO waste from the Walnuthdale dairy facility. These assessments performed on these fields document the field specific conditions including the following items:
 - i. Revised Universal Soil Loss Equation, Version 2 (RUSLE2) calculations have been performed on all fields. Slopes and soil types can be found in appendix three. Maps showing the soil types can be found in appendix two. The RUSLE2 evaluation is a USDA developed program that estimates the rate of soil erosion (in tons/acre/year) due to water erosion. The factors influencing this include the soil type, field slope, tillage practices, planned crops and manure applications. A summary sheet showing these evaluation results can be found in appendix five. Additionally, all fields that have estimated rates of soil erosion that exceed the tolerable limit (according to the soil type for each field) have a full evaluation sheet that show the current crop plan and estimated rate of erosion.
 - 1. The fields that have expected rates of soil loss exceeding the tolerable limit should not receive manure applications, or should be managed to ensure that manure will not move offsite. Practices that reduce the risk of offsite movement include injecting manure, utilizing cover crops and potentially implementing buffer strips and erosion reduction practices.
 - 2. Fields with 2012 crop plans that exceed the tolerable limit are listed in appendix six. There are 693 acres that are of concern due to sections in those fields where the predicted rate of erosion exceeds the tolerable limit. 218 acres of those have been seeded to alfalfa, have been planted to triticale over the winter, or are field that continued management is being reviewed.
 - 3. Tools that will be used to bring fields under the tolerable limit include increase crop residue on fields (using minimum or no-till practices, or high residue crops or cover crops); applications of manure will also increase the amount of residue in certain cases. The most effective tool to minimize the rate of soil erosion due to water movement is to plant cover crops after the primary crop has been harvested or to seed fields to alfalfa. Walnuthdale utilizes rye and triticale to reduce erosion rate and to capture nutrients while producing feedstuffs. These management practices will increase the residue and help hold the soil in place. Mitigating actions will be taken to prevent the offsite movement of nutrients from these fields.
 - 4. Walnuthdale currently uses conventional tillage including chisel plow, either in the spring or fall, and a drag/soil finisher prior to planting on most fields. They also implement no-till planting when possible depending on crops, rotation and manure applications. Manure applied to no-till ground is not incorporated (as allowed by the NPDES permit).

Those fields will be closely monitored to prevent offsite movement of nutrients.

- ii. Wind Erosion Equation (WEQ) data has been evaluated and compiled to identify areas of concern. Wind erosion can cause significant nutrient loss in the form of topsoil and can be a possible avenue of chemical and nutrient pollution. This sediment can carry chemicals and nutrients into ditches or other surface waters. Conserving this soil resource and protecting it from wind erosion can be accomplished by increasing the crop residue and the addition of manure where the soil tests and crop rotation allow. The NRCS developed Wind Erosion Equation (WEQ) is used to evaluate the soil types, tillage practices, planned crops and manure applications to estimate the soil erosion in tons/acre that will occur due to wind erosion. Soil types have an established value that is the tolerable limit for soil erosion "T." Fields that have predicted rates of soil erosion exceeding the tolerable limit are identified on a summary chart in appendix eight. All field in this CNMP that have an erodability index value ("I" value) that is at or above 86, have been reviewed to determine the estimated soil loss due to wind erosion. Worksheets for these field are found in appendix eight.
 1. 144 acres have been evaluated and found that the estimated rate of soil loss due to wind erosion is at or above the tolerable limit.
 2. Walnuthdale is reviewing crop plans to determine what types of control practices to implement on these fields. Addition of small grains in the crop rotation, seeding to alfalfa and utilizing no-till planting and cover crops are all tools available.
 3. Alternate crop plans for fields with wind erosion rates at or exceeding the tolerable limit have been developed and can be found following the summary table in appendix eight.
- iii. Locations of tile inlets, outlets, risers, conservation practices (buffers or waterways), and any conveyances to surface waters are identified on field maps found in appendix two. Areas sensitive to spreading are noted on color coded maps that are found in appendix two. Manure logs and copies of all maps will be kept in the tractors or made available to the operator prior to spreading. Sensitive areas identified on the maps include: waterways, open tile inlets/outlets, areas of unacceptable slope, wells and areas where manure should not be applied due to the proximity to residences.
 1. Tile line management relates to manure applications on fields that are drained through the use of drainage tile. Items in below are to be utilized as much as they are practical an possible to reduce the probability of a manure discharge to the surface waters of the state. Tile line outlets must be observed before, during and after the manure applications for change in color or odor of the tile discharge. Records of

these inspections will be logged on the appropriate forms found in appendix five.

a. Preventive Tile Line Management Practices

- i.** Lightly till the field prior to application by the use of a disc, harrow, rotary hoe or a field cultivator to seals the surface and close up any cracks on the soil that may exist.
- ii.** Inject manure or wastewater when possible or incorporate immediately after surface application.
- iii.** Evaluate the suitability of the field for manure application. Such evaluation shall take into account previous history, the soil type, locations of tile outlets, tile risers and tile depth. Asses each field for evidence of surface cracking and crop maturity and prior precipitation. Fields with surface cracking are not good candidates for application unless they have been tilled first. Fields with actively growing crops will help reduce the potential of a discharge. Fields that are saturated have less capacity to hold additional wastewater.
- iv.** Do not apply manure or wastewater if more than ½ inch of rain with 24hours is in the NWS forecast.
- v.** Manure applied with a higher dry matter content will be less likely to reach a tile line than dilute wastewater.
- vi.** Apply manure or wastewater on field with deep drainage tile rather than shallow drainage tile.
- vii.** Reduce the application rate. Excessive application rates increase the likelihood of saturating the soil causing ponding and the wastewater reaching the tile lines.
- viii.** Calibrate the application equipment. This will help prevent over application from occurring.
- ix.** Limit application rates to eliminate runoff and ponding of manure and wastewater.
- x.** Install slide valve drop boxes at tile outlets so that the flow of the tile may be stopped during manure applications.

b. Emergency action if a discharge is discovered

- i.** Stop the flow immediately. Blocking the tile outlet can do this, but may be difficult to do. A slide valve drop box would make this possible, if this has not been installed, blocking the tile outlet with soil or a fabricated cap may be possible. The tile outlet can be reopened at a later

date when the soil has had opportunity to absorb the manure or wastewater.

- ii. Block the flow in the ditch or stream. This may not be feasible and may require approval from the county drain commissioner. After the ditch is blocked, contaminated water should be pumped out into a tank spreader for land application at another site.
 - iii. Once immediate actions are taken to contain or minimize the discharge, and investigation of the probable cause of the discharge should be conducted. Variables to consider are many of the preventative management tools listed above.
 - iv. Notify the proper authorities listed in the Emergency Management Plan.
 - v. Record information regarding the discharge and execute a plan to prevent future discharges of that type.
- iv. Winter Application of Manure: Application of manure to ground that is frozen or snow covered and is not incorporated within 24 hours is prohibited by the NPDES permit, unless there is a field-by-field demonstration in accordance with the DEQ 2005 Technical Standard of the Surface Application of CAFO Waste on Frozen or Snow-Covered Ground Without Incorporation or Injection showing that such land application will not result in a situation where CAFO waste may enter the waters of the state. Demonstrations of these evaluations shall be kept with the CNMP and the Land application log and submitted to the DEQ prior to the use of that field. CAFO waste surface applied to ground that is frozen or snow covered shall be limited to no more than one year of crop removal of phosphorus removal per winter season, including pastures, forage crops such as alfalfa, wheat stubble or where no-till practices are used.
 - 1. Manure Application Risk Index (MARI) evaluations have been run as a guideline to identify fields that could be considered for winter application of manure. The MARI evaluation indicated that there are a total of 79 acres cording in the low category (scoring below 37). A list of all MARI evaluations can be found in appendix seven.
 - 2. Review of the fields scoring low on the MARI evaluation show that many of the fields scoring in the low range are long distances from the farm or are deemed unsuitable for winter application without incorporation.
 - 3. Walnutdale has committed to avoiding winter application of CAFO wastes. The pen pack manure from the hospital barn will be stockpiled on one of the pads at the dairy where all runoff is collected if this barn is cleaned out prior to spring.

4. In the event of an emergency during the winter months, the DEQ will be contacted before any application occurs and the data from the MARI evaluations will be used in conjunction with onsite knowledge to determine an appropriate site for application. Again, this is only in the case of an emergency.

b. Field Inspection Prior to Land Application

- i. Manure analyses are included in this plan (appendix four) and are taken annually. These samples are taken during manure application or during the loading process. This ensures representative samples are taken that reflect the manure being applied. Samples are recorded and submitted as required.
- ii. Soil sampling
 1. Nutrient management for crop production is based on current soil tests. Soil testing occurs every three years for each field. The samples are taken in the manner described on page 15 of this document.
 2. Results of all soil sampling can be found in appendix three on a chart that is in lbs/acre.
- iii. Prior to land application of CAFO waste, fields will be inspected with 48 hours of the application occurring. These records will be recorded on the daily manure application form found in appendix five. This inspection will document the state of all tile outlets (when applicable), evidence of soil cracking, the moisture holding capacity of the soil, crop maturity and the condition of designated conservation practices (i.e. grassed waterways, buffers, and diversions). The DEQ Daily Land Application log will be used to record this data and can be found in appendix five.
- iv. Immediately prior to land application, the tile outlets will be inspected, and at the end of the working day they will be inspected again to verify that manure is not leaving the field through the tile lines. This observation is done by seeing if the color of the liquid flowing from the tile is different at the end of the day/shift than it was at the beginning.
- v. All fields that receive waste application within the previous 30 days will be inspected within 24 hours after the first rainfall event of ½ inch or greater for the signs of discharge of waste. This inspection shall be recorded on the daily application form. If an inspection reveals a discharge, the DEQ shall be contacted immediately in accordance with the NPDES permit. If such an event occurs, it will be documented appropriately.
- vi. The land application equipment shall be inspected daily during use and recorded on the daily application log.

c. Land Application Recording Process:

- i. CAFO waste application will be recorded on the DEQ daily land application log (or summarized from multiple applicators in the same fields and transferred to a master daily form). These records will be maintained by (b) (6) (b) (6) or one of the trained staff at Walnutdale dairy.

- ii. Crop plan, yield goals and actual yields will also be recorded to ensure proper fertilization and nutrient utilization. Yield goals are based on past history and are set at reasonable rates that have been attained 50% of the time.
 - iii. The methodology and calculations showing nutrient application rates can be found on the Crops vs. Application rate chart found in appendix four. This is a quick reference chart that takes into account the planned crop, yield, type of application (injected, surface applied), source of manure, rate of application and gives credit for the previous nitrogen sources (i.e. legume crops from the prior year).
 - iv. The application of all nutrients to fields will be recorded.
 - 1. Any application of commercial fertilizer done by Walnuthdale employees will be recorded as required.
 - 2. Any custom application on fields will be recorded by the custom application firm. These records are also provided to Walnuthdale.
 - 3. A summary of all nutrients, CAFO wastes and commercial fertilizers will be included in the annual report as required for the NPDES reporting procedure.
 - v. Description of the weather conditions at the time of application, and for the 24 hours prior to and following the application, based on visual observations will be recorded.
 - vi. Printouts of weather forecasts (or digital copies stored on a computer) from the time of land application will be maintained by (b) (6) (b) (6) or one of his employees. These records will be saved digitally, or will be printed and filed into a folder.
- d. Prohibitions of applications:
- i. CAFO waste shall not be applied on land that is flooded or saturated with water at the time of application.
 - ii. CAFO waste shall not be applied during rainfall events.
 - iii. CAFO waste shall not be surface applied without incorporation to frozen or snow-covered ground, except in accordance with the technical standard.
 - iv. CAFO waste application shall be delayed if rainfall exceeding ½ inch or less, if any lesser rainfall event is capable of producing an unauthorized discharge, is forecasted by the National Weather Service during the planned time of application and within 24 hours after the time of planned application. Forecast models are the GFS MOX text for for Grand Rapids, MI (KGRR).
- e. Methods of Application: Prior to manure application the manure in the storage structure is agitated and then pumped into the application equipment. Manure application is performed by employees who have been trained for that role.
- i. Injection or incorporation may not be feasible on all crop rotations or practices (i.e. pastures, forage crops, wheat stubble, or no-till management). CAFO waste may be applied to these fields, but proper management must be done to ensure

that the waste does not move offsite. Application may not occur in situations where CAFO waste may, or is likely to enter the waters of the state.

- ii. On Ground that is frozen or snow covered, CAFO waste may be applied and not incorporated within 24 hours *only* if there is a field-by-field demonstration in accordance with the 2005 Technical standard showing that the application can occur without the offsite movement of nutrients. Any application of CAFO waste to frozen or snow-covered ground is limited to one crop year of phosphorus removal.
- f. Setbacks: All setbacks shall be measure from the ordinary high water mark, where applicable, of from the upper edge of the bank if the ordinary high water mark cannot be determined. Sensitive areas for manure application are noted in color coded maps and are included in appendix two. Manure application maps and application log forms will be provided to all operators applying manure.
 - i. CAFO waste shall not be applied closer than 100 feet to any surface waters, except for up gradient surface waters, ditches that are conduits to surface waters, open tile line intake structures, sinkholes or agricultural wellheads.
 - ii. The 100 foot setback can be reduced to 35 feet if a designated buffer is present. Waste may not be applied with the 35 foot buffer.
 - iii. Waste shall not be applied within grassed waterways and swales that are conduits to surface waters.
- g. Nitrogen Leaching: The leaching of nitrogen through the root zone is a concern because there are fields that are high risk on the nitrogen leaching index. There are 295 acres that are rated high risk for nitrogen leaching. The remaining acres fall into the medium category. Nitrogen leaching index ratings for all fields can be found on the MARI evaluation documents in appendix seven.
 - i. Preemptive steps to stop the offsite nutrient flow include timely incorporation and spreading only when there is no forecasted significant precipitation. These precautionary measures reduce the chance of nitrogen being pushed down through the soil structure by significant rainfall events.
 - ii. Walnutdale's nitrogen management program also helps reduce the risk of nitrogen leaching by splitting application and applying the nitrogen closest to when the plant can utilize it. This is done by using manure applications, starter programs, side-dress application of nitrogen, or preplant applications of slow release fertilizers.
 - iii. Pre-side dress soil nitrate testing has been used by Walnutdale dairy to identify fields that are low in nitrogen, tissue tests have also been used to determine nitrogen content in the plant at various growth stages.
 - iv. A post-harvest stalk analysis has been used to in the past to evaluate management practices, this will continue as needed. This review and evaluation process keeps Walnutdale's crop production profitable, while maintaining adequate nutrient management and minimizing the offsite movement of nitrogen.

- v. All records of nitrogen testing will be maintained at the Walnutdale office or by a consulting firm and will be made available as needed.

Record of CNMP Implementation

Records will be kept by (b) (6) (b) (6) and members of the Walnutdale Dairy staff at the office at the dairy location on 14th street. Records will be retained for five years and submitted to the DEQ as required by the NPDES permit issued to this facility. Annual summaries of this data will be stored on computers, as well as paper copies. These records will include the following items:

- Maps of Fields
- Soil Test Reports
- Manure Volume Produced
- Manure nutrient analysis results
- Record of manure sold or given away with manifest forms and the associated records required
- Dates of manure applications
- Source and rate of manure application
- Dates of incorporation
- Dates and rates of other nutrients applied
- Methods of all application
- Area of field application
- Weather conditions during and 24 hours before and after the application of manure
- Field conditions during application of manure
- Recommended nutrient application rates
- Previous and current crops grown and yields
- Plant tissue sampling and testing reports
- Pre-side dress nitrate test reports (when applicable)
- Inspection and maintenance records for application equipment
- Inspection logs for manure storage structures, plumbing, manure transfer systems and all other items required in the NPDES permit

Inspections, Operations & Maintenance and Training

Included in appendix five are sample logs sheets used to record all manure applications. Inspections of all manure handling equipment will be done by the manure operator before transport. Any piece of equipment found to be unsatisfactory will be taken out of use until it is appropriately repaired. The structural integrity of all storage facilities will be inspected when the manure storages are emptied. These inspections will be logged on the weekly inspection forms. Any issues with storage facilities will be identified and addressed as soon as possible. All repairs will be documented as stated in this plan.

After fall harvest, storage structures will be emptied to the point that there is six months of available storage capacity. This date will be recorded and submitted to the DEQ with the annual report.

Manure applicators are trained by Walnutdale Dairy management in areas of manure spreading, equipment handling and operation, as well as equipment maintenance and calibration. Manure application rates will be calibrated by Walnutdale employees, or with assistance from consulting firms. The dates and rates of manure application equipment calibrations are recorded. A list of completed calibrations can be found in appendix ten.

Schedule of Implementation

This Comprehensive Nutrient Management Plan will be implemented on December 1st, 2011 and will be updated annually accounting for new manure tests, soil tests and crop plans. Listed below are items that Walnutdale Dairy will be updating or addressing going as part of this management plan.

- Manure tests will be taken annually and submitted as part of the annual report
- Soil tests will be taken every three years as needed
- Crop and manure application plans are developed annually, and reviewed seasonally (spring and fall) to verify timing, application plan and to credit proper nutrient applications from manure for the following crop season.
- Manure application equipment will be calibrated and recorded annually.
- Annual update and review of the plan will be conducted
- Recertification of the plan will be conducted at minimum of once every three years

Emergency Action Plan

Outlined below are steps to follow in the event of manure storage structures, spills, runoff of CAFO waste leaving the target application area and other potential discharges. In the event of *any spill the goal is to stop the flow of nutrient from entering waters of the state.*

Breach of manure storage or failure of a storage structure:

1. Attempt to dam or berm any spill from entering clean water collection drains located around the farm. The flow direction of runoff at the production facility is identified on the site map. Collection inlets for the clean water drain are identified on the site map, if the flow of manure cannot be stopped, the clean water collection inlets should be bermed off with sand and the flow of manure directed toward the catch basin inlets.
2. In the event that manure reaches the 24" clean water drain, the outlet should be blocked to prevent the flow of manure onto the pasture area. Blocking this outlet with sand is one option.
3. Call (b) (6) (b) (6) (b) (6) .
4. Once the flow of the waste is contained, the manure should be removed from the discharge area by pumping into land application equipment or into another storage structure.
5. Call the DEQ Pollution alert system at 1-800-292-4706
6. After the spill has been addressed, document the incident and the corrective actions taken.

Manure spill on a roadway:

1. Stop any additional release of waste streams.
2. Build containment dams and remove manure by loading into land application equipment.
3. Call (b) (6) (b) (6) (b) (6) .
4. Contact the local road commission and drain commissioner or county sheriff if needed.
5. Wash manure from the roadway under advisement.
6. Call the DEQ Pollution alert system at 1-800-292-4706
7. After the spill has been addressed, document the incident and the corrective actions taken.

Manure spill in field:

1. Stop manure application.
2. Build containment dams.
3. Collect the manure and apply at agronomic rates in areas that are acceptable for application.
4. Call (b) (6) (b) (6) (b) (6) .

Runoff of manure from a field (either surface flow or from tile outlets):

1. Stop manure application.
2. Plow a diversion trench in the field to collect or divert the flow of manure. In the case of a tile discharge, block the tile outlet and collect the manure (more detailed tile management information can be found on pages 19-21).
3. Collect the manure and land apply at agronomic rates.

4. Call (b) (6) (b) (6) (b) (6) .

Manure Spill while loading from manure storage structures:

1. Turn off agitation or loading pump.
2. Divert or collect the manure back into the storage.
3. If the manure reaches clean water tile inlets, block the 24" drain line outlet and collect the manure at that point and land apply it or put it in one of the storage structures.
4. Call (b) (6) (b) (6) (b) (6)

Notes:

- In the event that a county drain or creek is affected, call the Allegan County Drain Commissioner @ 1-269-673-0440.
- Record and report any uncontrolled discharge of CAFO waste that warranted emergency response to the MDEQ Water Quality Division.
- Leaking or malfunctioning equipment should be kept away from ditches, streams and all conduits to surface water. Equipment not operating properly will be taken out of service immediately and repaired before further use.
- Records of all spills and incidences will be recorded. All spills will have an investigation done by Walnutdale employees as to why the spill occurred. The findings will be recorded and actions will be taken as needed to prevent spills from occurring in the future.

Emergency Numbers

MDEQ Pollution Alert System	1-800-292-4706
MDEQ Kalamazoo District Office	1-269-567-3500
Allegan County Drain Commissioner	1-269-673-0440
Allegan County Environmental Health	1-269-673-5411

(b) (6) (b) (6)

(b) (6)

References:

- GAAMPs – Generally Accepted Agricultural Management Practices for Manure Management and Utilization, Michigan Commission of Agriculture, February 2011. A copy has been included with the CNMP for reference.
- Manure Management Systems Program, developed by Purdue University
- Animal Waste Management Program, NRCS

Appendices:

- Appendix One
 - Site Maps & well isolation distance table
- Appendix Two
 - Application Field Maps
 - Color Coded Application maps with Aerial photos
 - Soil Survey maps and legends
- Appendix Three
 - Soil Test Summary Table
 - 2011 Crop Plan & Fertility Recommendations
 - 2012 Nutrient Management Plan with Crops, yield goals and commercial fertilizer recommendations
- Appendix Four
 - Current Manure Analysis
 - Liquid Manure application charts showing storage vs. planned crop application rates
 - 2011 & 2012 Manure Application Planning Calendar
 - 2012 Manure application Plan
 - Manure Application Equipment Worksheets
- Appendix Five
 - DEQ Daily Manure Application Record Form
 - Field Inspection Forms
 - Land application log
 - Land Application equipment Inspection form
 - Manifest Form for Large CAFO Wastes
 - Daily and Weekly Inspection and O&M Recording forms
 - Weekly Waste Storage Depth gauge inspection forms
 - Mortality Records Form
 - Report of Discharge form
 - Pasture Management Record Form
- Appendix Six
 - RUSLE2 summary and Evaluation Data
 - Field by field lists of predicted rate of erosion over the crop rotation
 - Current and alternate crop plans that would reduce the rates of soil erosion for fields that have predicted rates of erosion exceeding the tolerable limit.
- Appendix Seven
 - MARI Evaluation tables
- Appendix Eight
 - Wind Erosion Equation Evaluation summary and Alternate crop plan to reduce erosion rates
 - Evaluation worksheets for all fields with predicted rates of erosion at or exceeding the tolerable limit.
- Appendix Nine

- March 20, 2001 NRCS Evaluation of Existing Components Letter from NRCS
- January 20, 2004 As built summary for Pit #8 from NTH Consultants
- May 25, 2004 Evaluation of existing components letter from Green Valley Agricultural, Inc. for pit #7 (as-built data from NTH covers pit #8 that was also in that letter).
- July 2, 2004 NTH design proposal for the catch basin structure
- August 2004 NTH Drawings of the Catch Basin Structure.
- March 2011 CJD Farm Consulting Design of the Settling tank structure
- AWM Generated storage calculations for manure storage facilities
- Appendix Ten
 - Operations and Maintenance Guidelines for Manure storage structures
 - Mass Balance Evaluation data
 - Feed Nutrient Intake sheet (based on producer rations)
 - Estimated Phosphorus exported from the farm
 - Crop Nutrient Removal summary
 - Well isolation worksheets and logs for the two wells at the facility
 - Manure Management Planner Input Data based on AWM Results
 - Silage Leachate production worksheet